

Docket No. HRZ0003



PATENT

AF/3641  
VIA

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re the U.S. Application of

Herzel LAOR

Group Art Unit: 3641

U.S. Serial No.: 09/301,989

Examiner: Behrend, H.

Filed: April 29, 1999

For: METHOD AND APPARATUS FOR CONDENSING A BOSE-EINSTEIN  
CONDENSATE OF ATOMS

APPEAL BRIEF

Box AF  
Assistant Commissioner of Patents  
Washington, D.C. 20231

Sir:

This is an Appeal Brief under 37 C.F.R. § 1.192 in connection with the decision of the Examiner mailed on September 26, 2001. Each of the topics required by Rule 192 is presented herewith and is labeled appropriately.

**(1) Real Party In Interest**

The real party in interest is Condensate Energy LLC.

RECEIVED  
JAN 25 2002  
GROUP 3600

23 Appeal  
Brief 3  
1/29/02  
J. Holmes

**(2) Related Appeals And Interferences**

There are no other appeals or interferences related to this case.

**(3) Status Of Claims**

Claims 59-67 are pending.

**(4) Status of Amendments**

There are no outstanding amendments.

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**(5) Summary Of The Invention**

The present invention is directed to a method and apparatus for, *inter alia*, compressing a condensate of atoms having an overlapping wave function. (Pg. 3, ll. 8-9). An example of an appropriate condensate of atoms is a Bose-Einstein condensate. (Pg. 3, ll. 24-25). More specifically, the atoms comprising the condensate may be selected from, for example, Supra fluid liquid  $^4\text{He}$  and gaseous condensate of  $^1\text{H}_2$ . (Pg. 3, ll. 25-29). The compression method involves exposing the condensate to an energy source, preferably a high energy beam, focused on the condensate to maximize the intensity of the beam's energy. (Pg. 3, ll. 12-14). The energy source is selected from the following group including, but not limited to, an electron beam, a particle beam, a radio frequency energy beam, a high energy laser beam, an x-ray beam, or the like. (Pg. 4, ll. 1-2). More particularly, a femtosecond or faster pulsed laser beam is preferable. (Pg. 4, l. 4). The compression and resulting de-condensing of the atoms comprising the condensate facilitate tunneling of the coulomb potential barrier and production of a heavier isotope. (Pg. 3, ll. 29-31; pg. 7, ll. 25-30). The apparatus for facilitating the compression also includes a reaction chamber and an injection mechanism. (Pg. 4, ll. 10-17).

**(6) Issues**

- a) Whether the Examiner's objection to the specification and rejection of all of the claims under 35 U.S.C. § 112, first paragraph, is proper.

**(3) Status Of Claims**

Claims 59-67 are pending.

**(4) Status of Amendments**

There are no outstanding amendments.

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**(6) Issues**

- a) Whether the Examiner's objection to the specification and rejection of all of the claims under 35 U.S.C. § 112, first paragraph, is proper.

- (i) *Written Description Requirement*
- (ii) *Enablement Requirement*
- b) Whether the Examiner's rejection of all of the claims under 35 U.S.C. § 101 is proper.
- c) Whether the Examiner's rejection of claims 62-67 under 35 U.S.C. § 102(b) as being clearly anticipated by any of Lo (I) (US 4875213), Lo (II) (WO93/11543), Lo (III) (WO87/00681), Lo (IV) (US4926436), or Lo (V) (WO90/13130) is proper.
- d) Whether the Examiner's rejection of claims 59-67 under 35 U.S.C. § 103(a) as being unpatentable over any of Lo(I-V) in view of any of Corkum, Schaffer, Olson, Laser Focus World or Optical Materials & Engineering News is proper.

#### **(7) Grouping of Claims**

Claims 59-67 are arranged into a single group, wherein the claims within the group stand or fall together for purposes of this appeal.

GROUP	CLAIMS
I	59-67

#### **(8) Argument**

##### **The Objection To The Specification And The Rejection of Claims 59-67 Under 35. U.S.C. §112, First Paragraph Is Not Proper**

- (i) *Written Description Requirement*

The Examiner objects to the specification and rejects the claims, "as failing to provide an adequate written description of the invention and as failing to adequately teach how to make

and/or use the invention i.e., failing to provide an enabling disclosure, . . ." Initially, the Appellant wishes to point out that these are separate requirements under 35 U.S.C. §112. The written description requirement is separate and distinct from the enablement requirement. Vas-Cath, Inc. v. Mahurkar, 935 F.2d 1555, 1562 (Fed. Cir. 1991). To satisfy the written description requirement, a patent specification must describe the claimed invention in sufficient detail that one skilled in the art can reasonably conclude that the inventor has possession of the claimed invention. Id. at 1563 (Emphasis Added). Satisfaction of the written description requirement is wholly different from that of the enablement requirement which requires that the specification describe the invention in such terms that one skilled in the art can make and use the claimed invention. For purposes of fulfilling the written description requirement, the language of the pending claim limitations is found, virtually verbatim, within the specification. This language describes distinguishing identifying characteristics that show that the Appellant was in possession of the claimed invention at the time of filing.

The Examiner has the initial burden, after a thorough reading and evaluation of the content of the application, of presenting evidence or reasons why a person skilled in the art would not recognize that the written description of the invention provides support for the claims. MPEP §2163(II)(A) (Emphasis added). Taking each of the Examiner's arguments in turn, merely with respect to written description (enablement is discussed below), the Examiner finds:

- (1) "...no adequate description...of how nuclear fusion can actually be operatively obtained with the disclosed and claimed invention." This written description rejection is

improper as there is no limitation in any of the pending claims which uses this language. Written description is reviewed in view of the claimed invention. Appellant has not only fully satisfied the written description requirement, but also the other requirements under 35 USC §112 (as discussed later in the brief).

(2) "...no adequate description...of how and in what manner, a Bose-Einstein condensate can be formed from atoms inside the reaction chamber." This rejection is improper as there are no pending claim limitations in any of the pending claims which use this language or require the formation of a Bose-Einstein condensate inside a reaction chamber. Written description is reviewed in view of the claimed invention. Appellant has not only fully satisfied the written description requirement, but also the other requirements under 35 USC §112 (as discussed later in the brief).

(3) "...no adequate description...of how and in what manner, a Bose-Einstein condensate could be formed outside the reaction chamber, ..., and, as to how and in what manner it is caused to remain as a Bose-Einstein condensate while it is being transported/delivered to its ultimate point of use...." This rejection is improper as there are no pending claim limitations in any of the pending claims which use this language or require the formation of a Bose-Einstein condensate outside a reaction chamber or describe the transportation or delivery of the condensate. Written description is reviewed in view of the claimed invention. Appellant has not only fully satisfied the written description requirement, but also the other requirements under 35 USC §112 (as discussed later in the brief).

(4) "...no adequate description...of how and in what manner, it is ensured that two of the  $^4\text{He}$  will fuse to produce  $^8\text{Be}$ , that the  $^8\text{Be}$  will fuse with an  $^4\text{He}$  to produce  $^{12}\text{C}$  (nor is it ensured that there will be an  $^4\text{He}$  present or adjacent the  $^8\text{Be}$  such that fusion will occur before the unstable  $^8\text{Be}$  breaks up)." This rejection is improper as there are no claim limitations drawn to, *inter alia*, ensuring that any of the above identified steps occur. The language stated in this rejection is not the same as the language of the pending claims. The language of the pending claims is supported by the specification. Thus the written description requirement is met for the language of the pending claims. Written description is reviewed in view of the claimed invention. Appellant has not only fully satisfied the written description requirement, but also the other requirements under 35 USC §112 (as discussed later in the brief).

(5) "...no adequate description...of how and in what manner, a Bose-Einstein condensate can be encapsulated in a small plastic sphere and still remain as a Bose-Einstein condensate until irradiated with the laser beam in the reaction chamber...." This rejection is improper as there are no pending claim limitations in any of the pending claims which use this language or require that a Bose-Einstein condensate be encapsulated in a small plastic sphere and remain as a Bose-Einstein condensate until irradiated with the laser beam in a reaction chamber. Written description is reviewed in view of the claimed invention. Appellant has not only fully satisfied the written description requirement, but also the other requirements under 35 USC §112 (as discussed later in the brief).

(6) "...no adequate description...of how and in what manner, it is determined that a Bose-Einstein condensate is actually present." There is no claim language directed to

determining that a Bose-Einstein condensate is actually present. As described in the specification, Bose-Einstein condensates are known and examples of such are recited. Simply put, the claims do not recite the determining step stated by the Examiner. Further, just as limitations may not be read into the claims, the Examiner may not read limitations into the specification. Written description is reviewed in view of the claimed invention. Appellant has not only fully satisfied the written description requirement, but also the other requirements under 35 USC §112 (as discussed later in the brief).

(7) "...no adequate description...of how and in what manner, it is determined that at least two of the atoms within the Bose-Einstein condensate are 'co-located' as set forth in claim 59 and, that at least two atoms have 'overlapping wave functions' as recited in claim 62." Neither claim 59 nor claim 62 recite either one or the other of the steps of determining that at least two of the atoms within the Bose-Einstein condensate are co-located or the step of determining that at least two atoms have overlapping wave functions. Once again, written description is reviewed in view of the claimed invention. The steps recited by the Examiner are not recited in the pending claims. The language recited in claims 59 and 62 is indeed recited in the specification as originally filed and is further supported by the disclosure of each of the three (3) provisional applications to each of which the current utility application claims priority. Appellant has not only fully satisfied the written description requirement, but also the other requirements under 35 USC §112 (as discussed later in the brief).

(8) "...no adequate description...of how and in what manner, it is that all of the target means (e.g. Appellants element 102) exists only as a Bose-Einstein condensate." There is no

language in any of the claims that includes this limitation. Similarly, there is no language within the claims drawn to "a portion of the target means." There is no reference to "target means" within any of the claims and consequently there is no reference to the composition thereof within the claims. Written description is reviewed in view of the claimed invention.

(9) "The disclosure is insufficient as to the minimum (as well as to the maximum) number of atoms in the Bose-Einstein condensate necessary for Appellants invention to be operative in obtaining nuclear fusion." Again, the Appellant maintains that the language cited by the Examiner is not found in any of the pending claims. Written description is reviewed in view of the claimed invention. Appellant has not only fully satisfied the written description requirement, but also the other requirements under 35 USC §112 (as discussed later in the brief).

(10) "Appellants disclosure is also insufficient as to the requisite laser parameters, e.g., frequency, energy, etc., necessary to cause nuclear fusion in the Bose-Einstein condensate." Again, the Appellant maintains that the language cited by the Examiner is not found in any of the pending claims. While the claims disclose, for example, a beam having a pulse length of less than  $1 \times 10^{-15}$  seconds, this language is fully supported in the specification. See, for example, pg. 9, lines 25-31. Written description is reviewed in view of the claimed invention. Appellant has not only fully satisfied the written description requirement, but also the other requirements under 35 USC §112 (as discussed later in the brief).

The Final Office Action further states, "the examiner has shown that various necessary parameters have not been provided and, the examiner has provided evidence that the artisan does

not know the requisite parameters of an operative Bose-Einstein condensate fusion system, nor how to make an operative Bose-Einstein fusion system." Respectfully, there are NO claims directed to a fusion system. In fact, there are no system claims. The Examiner's rejection under 35 U.S.C. §112 is improper and misdirected. The subject matter of each of the claims is described, virtually verbatim, within the disclosure, which is the test for meeting the written description requirement under 35 U.S.C. §112. For the reasons stated herein, the Appellant respectfully requests that the rejection under 35 U.S.C. §112 be withdrawn.

(ii) *Enablement Requirement*

As set forth above, the enablement requirement invoked by 35 U.S.C. §112 is separate from the written description requirement. One thing remains constant as between the two requirements: the Examiner must base his/her review on the claimed subject matter. Stated another way, the invention that one skilled in the art must be enabled to make and use is that defined by the claim(s) of the particular application. MPEP §2164. The test of enablement is whether one reasonably skilled in the art could make or use the invention from the disclosures in the patent coupled with information known in the art without undue experimentation. United States v. Teletronics, Inc., 857 F.2d 778, 785 (Fed. Cir. 1988). With regard to undue experimentation, the fact that experimentation may be complex does not necessarily make it undue, if the art typically engages in such experimentation. Massachusetts Institute of Technology v. A.B. Fortia, 774 F.2d 1104 (Fed. Cir. 1985).

Initially, to avoid being repetitive, each of the limitations set forth by the Examiner in paragraphs (1) - (10) above were also cited by the Examiner as not being supported by an

enabling disclosure. As pointed out previously by Appellant, none of the limitations cited by the Examiner in the rejection under 35 U.S.C. §112 are found in the pending claims. Since the tests for both written description and enablement require review of the claim language, the Examiner has failed to meet his initial burden. MPEP §2164.04. The Examiner must explain why the **claim scope** is not adequately enabled. In re Wright, 999 F.2d 1557, 1562, 27 USPQ2d 1510, 1513 (Fed. Cir. 1993). That said, the Appellant, for the sake of clarity, will discuss those portions of the specification that enable the **claimed subject matter**. In discussing the enablement of the claimed subject matter, it is important to bear in mind that the level of skill in the atomic compression art is extremely high and the art is relatively complex, but the problems that have been identified by those skilled in the art have been reduced to a few specific areas of the art. The claims of the present application and the supporting specification are directed to these specific problem areas. Consequently, the disclosure need not elaborate on those well known and established areas of the compression art which have been exhaustively discussed in the literature. A specification which contains a teaching of the manner and process of making and using an invention in terms which correspond in scope to the claims must be taken as being in compliance unless there is reason to doubt the objection truth. MPEP 2164.04.

Claim 59 states: "*A process for compressing atoms within a Bose-Einstein condensate comprising: providing a Bose-Einstein condensate comprised of multiple  $^4$ He atoms, wherein at least two of the  $^4$ He atoms within the Bose-Einstein condensate are co-located; focusing a beam having a pulse length of less than  $1 \times 10^{-15}$  seconds on the Bose-Einstein condensate such that the co-located at least two  $^4$ He atoms compress to form a  $^8$ Be isotope.*" Referring to the

specification, a compression system comprised of at least a beam source for generating a beam and a focusing system for focusing the beam is described and illustrated in the Figures. (Pg. 9, ll. 16-21). The beam source may be any of multiple sources as would be known by one skilled in the art, selected such that the pulse length of the beam is at least as short as the lifetime of the most transitory compression output particle. (Pg. 9, ll. 21-27). In the case of claim 59, the most transitory compression output particle is the unstable <sup>8</sup>Be isotope resulting from the compression of two co-located <sup>4</sup>He atoms. (Pg. 9, ll. 27-28). The lifetime of the unstable <sup>8</sup>Be isotope is on the order of  $1 \times 10^{-15}$  seconds. (Pg. 9, ll. 28-31). The specification, as well as one skilled in the art, recognizes that an appropriate beam source for this particular embodiment is a femto-second laser have a pulse length on the order of  $1 \times 10^{-15}$  seconds. (Pg. 11, ll. 9-11; pg. 13, ll. 4-7). Further, the focusing system may include at least one lens or mirror, or other active components known to those skilled in the art. (Pg. 13, ll. 8-12). Examples of particular focusing systems are illustrated in Figures 3 (using lenses) and 4 (using mirrors), respectively, and described accordingly within the specification. Consequently, the Appellant fails to see how the **limitations of the claims** are not enabled by the specification in combination with what is known to those skilled in the art. The unclaimed components of the compression system, such as the particulars of the compression chamber, are notoriously well known to those skilled in the art. Compression chambers can be found in virtually every major Government laboratory in the United States, including The Naval Research Laboratory, Lawrence Livermore National Laboratory, Sandia National Laboratory, etc. As such, it is not necessary to describe this or

related components in detail. In fact, this type of known technology is preferably omitted from a patent application. In re Buchner, 929 F.2d 660, 661 (Fed. Cir. 1991).

Claim 60 states: "*The process according to claim 59, wherein the resulting  $^8\text{Be}$  isotope is co-located with a  $^4\text{He}$  atom within the Bose-Einstein condensate and further wherein the interaction between the beam and the co-located  $^8\text{Be}$  isotope and the  $^4\text{He}$  atom results in at least a  $^{12}\text{C}$  atom..*" This step in the process is set forth explicitly in the specification on at least page 7, ll. 25-30.

Claim 61 states: "*The process according to claim 59, wherein the beam is focusing on the Bose-Einstein condensate from at least two opposite directions.*" The specification discloses, "[t]wo femto-second laser beams 109 are then focused with lenses 110 through windows 112, and are directed at the Bose-Einstein condensate 102 from substantially opposing directions." (Pg. 11, ll. 9-11). Additionally, the specification provides, "[t]he illustrated embodiment shows the focusing of two laser beams 302 by lenses 306 into spherical wavefronts (indicated by arcs 308) for improved compression." (Pg. 11, ll. 30-32). Further, the dual beams impinging from opposite directions are illustrated in Figures 1, 3, and 4. The specification provides explanation for the dual beam approach, as do the three (3) provisional applications to which the present utility application claims priority.

Claim 62 states: "*A process for tunneling through a potential energy barrier between at least two atoms comprising: providing a Bose-Einstein condensate comprised of at least two atoms having overlapping wave functions; and compressing the atoms having overlapping wave functions to facilitate tunneling through the potential energy barrier existing between the at least*

*two atoms within the Bose-Einstein condensate, wherein the tunneling through the potential energy barrier results in the formation of at least a first isotope within the Bose-Einstein condensate.*" The limitations of this claim, as well as dependant claims 63-67, are enabled by the specification as described with reference to the support provided for the limitations of claim 59 above. Additionally, further guidance and support is found in the three (3) provisional applications cited within the first paragraph of this application. One skilled in the compression art could perform this claimed process, without undue experimentation, utilizing the specification in conjunction with that which is known in the art.

For the reasons stated herein, the Appellant respectfully requests that the rejection under 35 U.S.C. §112 be withdrawn.

**The Rejection of Claims 59-67 Under 35 U.S.C. § 101 Is Not Proper**

A rejection under 35 U.S.C. §101 is proper only where the Appellant has not claimed a useful invention, i.e., the claimed invention lacks utility. In this application, the Appellant has asserted a specific, substantial, and credible utility for the claimed atomic compression process: the generation of energy. (page 3, ll. 8-11). According to the MPEP guidelines to the Examiner, "[i]f at any time during the examination, it becomes readily apparent that the claimed invention has a well-established utility, do not impose a rejection based on lack of utility." MPEP §2107. The generation of energy through atomic compression is appreciated by those skilled in the art as "useful." This use is repeated and highlighted throughout the specification. (page 7, ll. 25-30). Consequently, this rejection is misplaced and improper.

The Examiner's lack of utility rejection is premised on the allegation by the Examiner that the invention is inoperative. The Federal Circuit has stated, “[t]o violate [35 U.S.C.] 101 the claimed device must be totally incapable of achieving a useful result.” Brooktree Corp. v. Advanced Micro Devices, Inc., 977 F.2d 1555, 1571, 24 USPQ2d 1401, 1412 (Fed. Cir. 1992) (emphasis added). Situations where an invention is found to be “inoperative” and therefore lacking in utility are rare, and rejections maintained solely on this ground by a Federal court are even rarer. MPEP §2107.01 II. Further,

A small degree of utility is sufficient . . . The claimed invention must only be capable of performing some beneficial function . . . An invention does not lack utility merely because the particular embodiment disclosed in the patent lacks perfection or performs crudely . . . A commercially successful product is not required . . . Nor is it essential that the invention accomplish all its intended functions . . . or operate under all conditions . . . partial success being sufficient to demonstrate patentable utility . . . In short, the defense of non-utility cannot be sustained without proof of total incapacity.

E.I. du Pont De Nemours and Co. v. Berkley and Co., 620 F.2d 1247, 1260 n.17, 205 USPQ 1, 10 n.17 (8<sup>th</sup> Cir. 1980) (emphasis added). If an invention is only partially successful in achieving a useful result, a rejection of the claimed invention as a whole based on a lack of utility is not appropriate. See In re Brana, 51 F.3d 1560, 34 USPQ2d 1436 (Fed. Cir. 1995).

Referring to the Examiner's arguments from paper no. 11, mailed February 21, 2001 which the Examiner incorporated into his decision mailed on September 26, 2001, the Examiner's various basis for his *prima facie* case of inoperability include, *inter alia*:

(1) a 19 line excerpt from an arbitrary, non-scientifically supported website, which is apparently intended to bash and discredit a particular company's actions with respect to BASER technology;

(2) a declaration by Mr. Shui-Yin Lo which supports the credibility of the BASER technology;

(3) the alleged fact that the Appellant's fusion system is not a conventional fusion system;

(4) the Examiner's understanding of the present scientific consensus on cold fusion as an unproven alleged phenomenon; and

(5) the alleged fact that fusion energy is not in commercial operations.

In keeping with the Appellant's earlier responses to this inoperability rejection, the Appellant reiterates at this time that neither the specification nor the claims are directed to BASER technology. Consequently, the Appellant fails to understand how (1) and (2) are relevant to the current application. Further, the evidence cited in (1) refers to the use of a BASER to neutralize nuclear waste. There is no mention of a BASER or the neutralization of nuclear waste in the specification or the claims of the present application. Also, the evidence set forth in the declaration of Mr. Lo supports the operability of a BASER, not the inoperability thereof. This begs the question, how is evidence of operability used to establish a *prima facie* case of inoperability? Further, how is evidence of the operability or inoperability of BASER technology relevant to the operability of the invention set forth in this application.

With regard to the facts and reasoning alleged in (3)-(5), the fact that a system or process is not conventional, certainly does not establish a case of inoperability. Is not the entire premise of the patent laws and indeed the constitutional support therefore, based on the recognition and protection of unconventional inventions? The application of an inoperability rejection for unconventional systems and processes, would indeed circumvent the patenting process. Further,

while the Examiner sets forth the scientific consensus on cold fusion as being an unproven phenomenon, the Examiner states in the sentence which follows, "...the examiner does not believe the Appellant's invention is related to the 'cold fusion' concept, ..." Again, this begs the question, how is the scientific community's opinion in one area of technology applicable to a second and different area of technology for establishing a *prima facie* case of inoperability in the second area of technology? Finally, the Examiner's reference to the commercial applicability of the invention is simply not evidence of inoperability as stated in the case law above.

Consequently, the Examiner has set forth no basis for establishing a *prima facie* case of inoperability. The standard is quite high has is illustrated through the case law. Evidence as to the operability of an unrelated area of technology is not applicable. Further, the application clearly sets forth the utility of the invention. For the reasons stated herein, the Appellant respectfully requests that the rejection under 35 U.S.C. §101 be withdrawn.

**The Rejection of Claims 62-67 Under 35 U.S.C. § 102(b) As Being Anticipated By Any of Lo (I-V) Is Not Proper**

Each of the Lo references, I-V, cited by the Examiner describes a method and system for, in essence, providing co-located atoms, or, said another way, providing atoms having overlapping wave functions. None of the Lo references perform the compression step required by independent claims 59 and 62. More particularly, independent claim 59 requires in addition to providing a Bose-Einstein condensate having at least two co-located atoms, the limitation of "focusing a beam having a pulse length of less than  $1 \times 10^{-15}$  seconds on the Bose-Einstein condensate such that the co-located at least two  $^4\text{He}$  atoms compress to form a  $^8\text{Be}$  isotope."

(emphasis added). Similarly, independent claim 62 requires in addition to "providing a Bose-Einstein condensate comprised of at least two atoms having overlapping wave functions," the limitation of, "compressing the atoms having overlapping wave functions to facilitate tunneling through the potential energy barrier existing between the at least two atoms within the Bose-Einstein condensate, . . ." (emphasis added). None of the Lo references disclose either of these compression steps.

For example, in Lo(I), the specification is directed to focusing an intense light from a laser on a superfluid to cause a coherent boson beam to be formed. This reference describes, at best, only the initial "providing step" of independent claims 59 and 62. The Lo(I) reference does not disclose compressing the coherent bosons to form an isotope as required by each of the pending claims. Consequently, Lo(I) cannot anticipate any of claims 59-67. Similarly, the Lo(III) reference is also drawn solely to, at best, the initial step of the independent claims, that is, the Lo(III) reference describes a method and system for providing co-located atoms or atoms having overlapping wavefunctions in the form of a coherent beam. Like Lo(I), there is no discussion in Lo(III) of compressing the coherent beam to form an isotope.

Similarly, Lo(II) refers to forming a coherent beam and does not describe the step of compressing the coherent atoms to form an isotope. As in the Lo(I) and Lo(III), the disclosure of Lo(II) is directed to forming coherent deuterium and alpha particles through ionization, but does not describe the additional necessary step of compression the coherent particles to form an isotope. In Lo (V), the reference states, "[t]he deuterons in the described pellets are rendered strongly coupled or ultimately coherent by the incidence of the laser beam thereon, . . ."

Consequently, the Lo(V) reference does not anticipate the compression step. Finally, L(IV) is directed to accelerating coherent bosons, not compressing coherent bosons to form an isotope. The process described in L(IV) does not anticipate the steps of independent claims 59 and 62.

The Examiner refers specifically to the bottom of page 15 of the Lo(V) reference as indicating, "that coherent alphas will fuse to produce  $^8\text{Be}$ ." The bottom of page 15 refers to the interaction between coherent photons, coherent helium atoms or coherent bosons with deuterium to produce nuclear energy. This interaction between coherent photons, helium atoms or bosons and a mass, i.e., deuterium, does not anticipate the claimed limitations of, *inter alia*, providing a Bose-Einstein condensate having co-located atoms and compressing the co-located atoms to form an isotope. The claims do not require that the coherent particles interact with a mass, but rather that the coherent particles themselves be compressed, not just interact, so as to form an isotope.

Further, the Examiner states on Page 10 of the final Office Action,

[A]s indicated by the above examples, it is considered that the references each disclose the same structure or system and manner of operation as recited in the claims. Accordingly, this system and manner of operation of any references must also inherently function in the same manner to produce the same result.

(emphasis added). Once again, there are no system claims pending in the application.

Independent claims 59 and 62 are process claims. The references do not anticipate the process limitations of the process claims.

**The Rejection of Claims 59-67 Under 35 U.S.C. § 103(a) As Being Unpatentable Over Any of Lo (I-V) View of Any of Corkum, Schaffer, Olson, Laser Focus World or Optical Materials & Engineering News is Not Proper**

Referring to the arguments above, none of the primary references, Lo(I) through Lo(V), anticipate the limitations of claims 59-67. Specifically, these references do not suggest the required limitation of compressing coherent atoms of a Bose-Einstein condensate to form an isotope. None of the secondary references cited by the Examiner suggest this missing limitation. Instead, these secondary references are cited to show the use of femtosecond lasers in the fusion art. Consequently, none of the references cited, either alone or in combination, anticipate or render obvious the limitations of the pending claims. As such, the Appellant respectfully requests that the Examiner's rejections be withdrawn and the claims allowed for the reasons stated herein.

**(9) Conclusion**

For at least the reasons given above, the rejections of claims 59-67 are improper. Appellant respectfully requests that the final rejection by the Examiner be reversed and claims 59-67 be allowed. Attached below for the Board's convenience is an Appendix which lists the currently pending claims.

Respectfully submitted,

Herzel LAOR

  
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**APPENDIX**

59. A process for compressing atoms within a Bose-Einstein condensate comprising:  
providing a Bose-Einstein condensate comprised of multiple  $^4\text{He}$  atoms, wherein at least two of the  $^4\text{He}$  atoms within the Bose-Einstein condensate are co-located;  
focusing a beam having a pulse length of less than  $1 \times 10^{-15}$  second on the Bose-Einstein condensate such that the co-located at least two  $^4\text{He}$  atoms compress to form a  $^8\text{Be}$  isotope.

60. The process according to claim 59, wherein the resulting  $^8\text{Be}$  isotope is co-located with a  $^4\text{He}$  atom within the Bose-Einstein condensate and further wherein the interaction between the beam and the co-located  $^8\text{Be}$  isotope and the  $^4\text{He}$  atom results in at least a  $^{12}\text{C}$  atom.

61. The process according to claim 59, wherein the beam is focusing on the Bose-Einstein condensate from at least two opposite directions.

62. A process for tunneling through a potential energy barrier between at least two atoms comprising:  
providing a Bose-Einstein condensate comprised of at least two atoms having overlapping wave functions; and  
compressing the atoms having overlapping wave functions to facilitate tunneling through the potential energy barrier existing between the at least two atoms within the Bose-Einstein condensate, wherein the tunneling through the potential energy barrier results in the formation of at least a first isotope within the Bose-Einstein condensate.

63. The process according to claim 62, wherein the at least two atoms are  $^4\text{He}$  atoms.

64. The process according to claim 62, wherein the first isotope is  $^8\text{Be}$ .

65. The process according to claim 62, wherein the first isotope has a lifetime on the order of  $1 \times 10^{-15}$  seconds and during the lifetime has an overlapping wave function with a  $^4\text{He}$  atom within the Bose-Einstein condensate.
66. The process according to claim 65, further comprising: compressing the first isotope and the  $^4\text{He}$  atom with the overlapping wave functions in order to form at least a second atom.
67. The process according to claim 66, wherein the second atom is  $^{12}\text{C}$ .